

**Amendment to the Claims**

This listing of claims will replace all prior versions and listing of claims in the application:

**Listing of Claims:**

Claims 1 – 39 (canceled)

Claim 40 (currently amended) A method of locating a portion of tissue with a characteristic of interest, the method comprising the steps of:

(a) characterizing an acetowhitening signal from a temporal sequence of images of a tissue following application of a chemical agent to the tissue, wherein the chemical agent comprises acetic acid;

(b) analyzing the acetowhitening signal to determine a measure of similarity between two selected regions of the tissue, the measure of similarity indicating how similarly tissue in each region responds to the chemical agent, and grouping the two selected regions if the measure of similarity is larger than a given threshold, wherein the step of determining the measure of similarity comprises, for each of the two selected regions, averaging ~~time-series-data~~ corresponding to pixels within the region at each of a plurality of time steps to obtain a mean signal for the region, then quantifying the similarity between the two resulting means signals;

(c) repeating step (b), thereby differentiating regions according to how tissue in each region responds to the chemical agent; and

(d) locating a portion of the tissue with a characteristic of interest, the located portion corresponding to at least one of the differentiated regions.

Claim 41 (previously presented) The method of claim 40, wherein step (b) further comprises merging the two selected regions into a single region if the measure of similarity satisfies a predetermined criterion.

Claim 42 (previously presented) The method of claim 41, wherein steps (b) and (c) together comprise iteratively segmenting an area of the tissue into regions according to evolution of mean intensity of each region following application of the chemical agent.

Claim 43 (previously presented) The method of claim 40, wherein step (c) comprises repeating step (b) for each of a plurality of pairs of selected regions.

Claim 44 (previously presented) The method of claim 40, wherein the measure of similarity indicates a similarity in evolution of mean intensity of each region following application of the chemical agent.

Claim 45 (previously presented) The method of claim 40, wherein step (b) comprises computing an N-dimensional dot product of mean signal intensities of the two selected regions.

Claim 46 (previously presented) The method of claim 40, wherein the chemical agent further comprises a member selected from the group consisting of formic acid, propionic acid, butyric acid, Lugol's iodine, Shiller's iodine, methylene blue, toluidine blue, and indigo carmine.

Claim 47 (canceled)

Claim 48 (previously presented) The method of claim 40, further comprising the step of:

- (e) determining a condition of the located portion.

Claim 49 (previously presented) The method of claim 48, wherein the condition comprises a member selected from the group consisting of normal squamous tissue, metaplasia, CIN I, CIN II, CIN III, and CIN II/III.

Claim 50 (previously presented) The method of claim 48, wherein step (e) comprises determining a condition of the located portion based at least in part on evolution of mean intensity of the located portion.

Claim 51 (previously presented) The method of claim 48, wherein step (e) further comprises obtaining a biopsy specimen within the located portion prior to determining the condition of the located portion.

Claim 52 (previously presented) The method of claim 40, wherein the characteristic of interest is a suspicion of pathology.

Claim 53 (previously presented) The method of claim 40, wherein the tissue comprises cervical tissue.

Claim 54 (previously presented) The method of claim 40, wherein the tissue comprises at least one member selected from the group consisting of epithelial tissue, colorectal tissue, skin, and uterine tissue.

Claim 55 (previously presented) The method of claim 40, further comprising the step of illuminating the tissue using a white light source, a UV light source, or both.

Claim 56 (currently amended) A method of differentiating regions of a tissue, the method comprising the steps of:

- (a) accessing a temporal sequence of images of a tissue following application of a chemical agent to the tissue; and
- (b) creating a segmentation mask that represents an image plane divided into regions according to how similarly tissue in each region responds to the chemical agent, wherein step (b) comprises analyzing an acetowhitening signal to determine a measure of similarity between two selected regions of the tissue, the measure of similarity indicating how similarly tissue in each region responds to the chemical agent, and grouping the two selected regions if the measure of similarity is larger than a given threshold, wherein the step of determining the measure of similarity comprises, for each of the two selected regions, averaging ~~time-series-data~~ corresponding to pixels within the region at each of a plurality of time steps to obtain a mean signal for the region, then quantifying the similarity between the two resulting means signals.

Claim 57 – 61 (canceled)

Claim 62 (previously presented) The method of claim 56, wherein the chemical agent comprises a member selected from the group consisting of acetic acid, formic acid, propionic acid, butyric acid, Lugol's iodine, Shiller's iodine, methylene blue, toluidine blue, and indigo carmine.

Claim 63 (previously presented) The method of claim 56, wherein the chemical agent comprises acetic acid.

Claim 64 (previously presented) The method of claim 56, further comprising the step of:

(c) locating a portion of the tissue with a characteristic of interest, the located portion corresponding to at least one of the differentiated regions.

Claim 65 (previously presented) The method of claim 64, further comprising the step of:

(d) determining a condition of the located portion.

Claim 66 (previously presented) The method of claim 65, wherein the condition comprises a member selected from the group consisting of normal squamous tissue, metaplasia, CIN I, CIN II, CIN III, and CIN II/III.

Claim 67 (canceled)

Claim 68 (previously presented) The method of claim 56, wherein the tissue comprises cervical tissue.

Claim 69 (previously presented) The method of claim 56, wherein the tissue comprises at least one member selected from the group consisting of epithelial tissue, colorectal tissue, skin, and uterine tissue.

Claim 70 (currently amended) A system for differentiating regions of a tissue, the system comprising:

a light source that illuminates a tissue;

a camera that obtains a temporal sequence of images of the tissue following application of a chemical agent to the tissue, the chemical agent comprising acetic acid; and

software that performs the steps of:

(i) characterizing an acetowhitening signal from the temporal sequence of images;

(ii) analyzing the acetowhitening signal to determine a measure of similarity between two selected regions of the tissue, the measure of similarity indicating how similarly tissue in each region responds to the chemical agent, and grouping the two selected regions if the measure of similarity is larger than a given threshold, wherein the step of determining the measure of similarity comprises, for each of the two selected regions, averaging ~~time-series data~~ corresponding to pixels within the region at each of a plurality of time steps to obtain a mean signal for the region, then quantifying the similarity between the two resulting mean signals; and

(iii) repeating step (ii), thereby differentiating regions according to how tissue in each region responds to the chemical agent.

Claim 71 (previously presented) The system of claim 70, wherein the chemical agent further comprises a member selected from the group consisting of formic acid, propionic acid, butyric acid, Lugol's iodine, Shiller's iodine, methylene blue, toluidine blue, and indigo carmine.

Claim 72 (previously presented) The system of claim 70, wherein the software further performs the step of:

(c) locating a portion of the tissue with a characteristic of interest, the located portion corresponding to at least one of the differentiated regions.

Claim 73 (previously presented) The system of claim 72, further comprising the step of:

(d) determining a condition of the located portion.

Claim 74 (previously presented) The system of claim 73, wherein the condition comprises a member selected from the group consisting of normal squamous tissue, metaplasia, CIN I, CIN II, CIN III, and CIN II/III.

Claim 75 (previously presented) The system of claim 73, wherein the condition comprises a member selected from the group consisting of CIN II, CIN III, and CIN II/III.

Claim 76 (previously presented) The system of claim 70, wherein the tissue comprises cervical tissue.

Claim 77 (previously presented) The system of claim 70, wherein the tissue comprises at least one member selected from the group consisting of epithelial tissue, colorectal tissue, skin, and uterine tissue.

Claim 78 (previously presented) The method of claim 48, wherein the condition comprises a member selected from the group consisting of CIN II, CIN III, and CIN II/III.

Claim 79 (previously presented) The method of claim 65, wherein the condition comprises a member selected from the group consisting of CIN II, CIN III, and CIN II/III.

Claim 80 (previously presented) The method of claim 56, wherein the step of creating the segmentation mask comprises analyzing an acetowhitening signal characterized from the temporal sequence of images, wherein the chemical agent comprises acetic acid.